

SIX NEW SPECIES OF *TENTHREDO* LINNAEUS (HYMENOPTERA: TENTHREDINIDAE) FROM INDIA

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Abstract.—Six new species of *Tenthredo* are described from India: *garhwali*, *manganensis*, *flatopleura*, *muchi*, *corrugatocephala* and *valvurata*. The genitalia are illustrated and the new species are separated from previously described related taxa. The population variation is also discussed.

Malaise's (1945) comprehensive study on southeastern Asian *Tenthredo* brought together all of the previously scattered work on this genus and is still the most exhaustive study available. He added 18 new species to the Indian fauna. The only additional works since Malaise are that by Muche (1982, 1983) who described an additional three species from India. In this paper, one of a series of papers on Indian *Tenthredo*, six new species are described. The terminology follows that of Ross (1937, 1945) and Malaise (1945). Holotypes and paratypes are deposited in the IARI, PUSA National Collection, New Delhi, India.

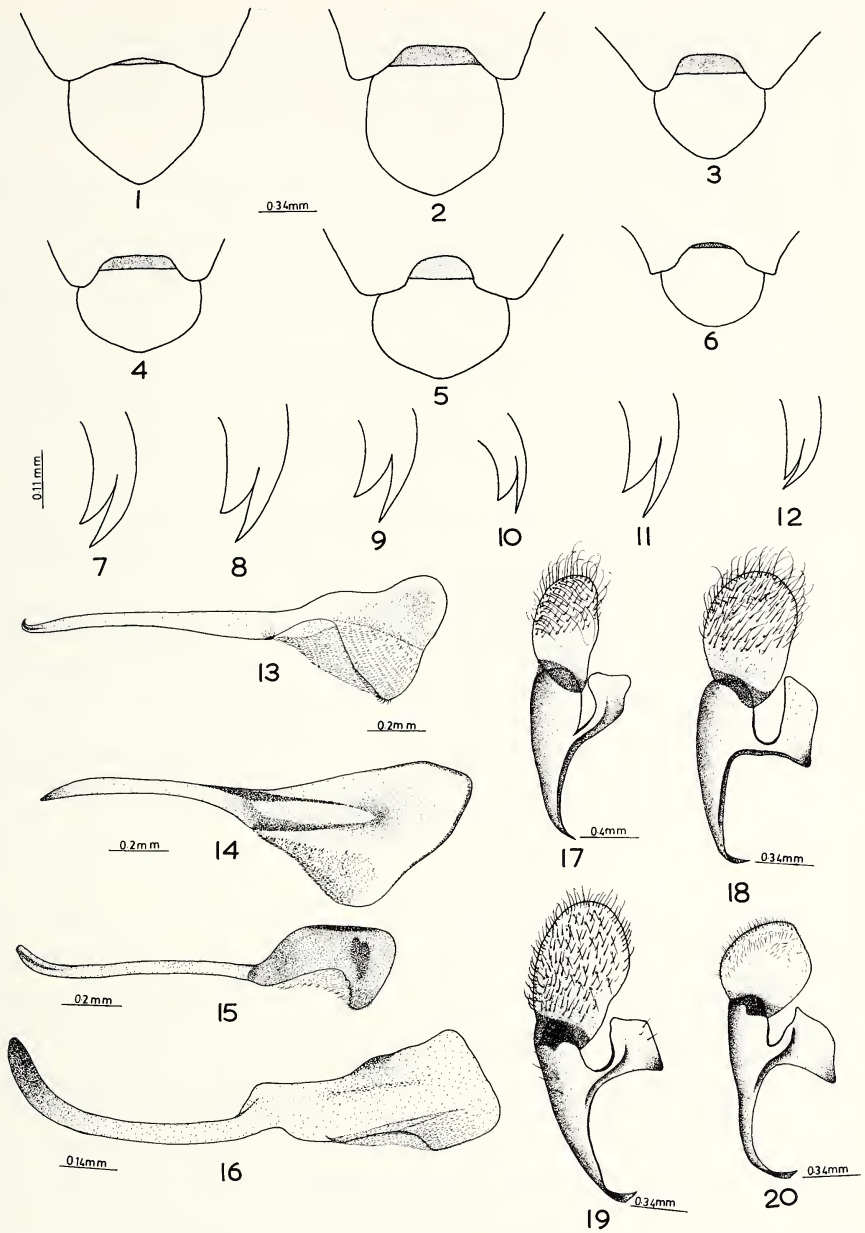
The following abbreviations are used in the descriptions: EL—eye length; ICD—interceni distance; IDMO—interocular distance at level of median ocellus; ITD—intertergal distance; LID—lower interocular distance; OCL—oculo-occipital line; OOL—oculo-ocellar line; POL—post-ocellar line.

Tenthredo garhwali, new species

Figs. 1, 7, 13, 17, 21

Description. FEMALE. Average length, 12.2 mm. Body black, pale green as follows: basal half of mandible; face below antenna; lower half of hind orbit; tip of supraantennal tubercle; dorsal and ventral angles of pronotum; tegula; triangular apex of mesonotal middle lobe; meso- and metascutelli and spots lateral to them; ridges lateral to meso- and metascutelli; medial band along anterior margin of metapostnotum; spot on posterodorsal aspect of meso- and metepimera; mesepisternum except anterodorsal angle; metepisternum; triangular medial spot on propodeum; medial longitudinal band of equal width on terga 2-5, decreasing in width on 6-9; underside of abdomen; pro- and mesolegs except posterior stripe along distal halves of femora, tibiae and mesobasitarsus (tips of tarsal joints infuscate); metacoxa except outer stripe; underside of metatrochanter and femur. Wings dusky hyaline, stigma and venation dark brown to black.

Antenna slightly compressed, $2.3 \times$ head width, segments 3 and 4 in ratio 4:3; clypeus (Fig. 1) slightly, roundly emarginate; labrum indistinctly broader than long with subacuminate anterior margin; malar space $0.5 \times$ diameter of lateral ocellus; LID:IDMO:EL = 2.0:4.4:4.3; OOL:POL:OCL = 3.8:1.0:1.9; frontal area much below level of eyes; supraantennal tubercle slightly raised and merging into insignificant frontal ridge; median fovea shallow with flat bottom; circumocellar furrow absent,



Figs. 1-20. 1-6. Clypeus. 1. *garhwali*. 2. *manganensis*. 3. *flatopleura*. 4. *muciei*. 5. *corrugatocephala*. 6. *valvurata*. 7-12. Tarsal claw. 7. *garhwali*. 8. *manganensis*. 9. *flatopleura*. 10. *muciei*. 11. *corrugatocephala*. 12. *valvurata*. 13-16. Penis valve. 13. *garhwali*. 14. *manganensis*. 15. *corrugatocephala*. 16. *valvurata*. 17-20. Gonoforceps. 17. *garhwali*. 18. *manganensis*. 19. *corrugatocephala*. 20. *valvurata*.

inter- and postocellar ones clear; lateral furrow deep; postocellar area subconvex, broader than long in ratio 2:1; head narrowing behind eyes; ITD:ICD = 2.9:1.0; mesoscutellum roundly raised with faint transverse carina; appendage not carinate; mesepisternum obtusely raised to rounded apex; mesosternum lacking thorns; apical tooth of claw (Fig. 7) longer than subapical; metabasitarsus as long as following 3 joints combined; metafemur slightly shorter than tibia.

Head shining with few indistinct punctures, hind orbit minutely and densely punctured; mesonotum also shining with minute and distinct punctures, particularly along seams; mesoscutellum distinctly punctured on posterior slope only; appendage, metanotum and scutellum impunctate; mesepisternum shallowly punctured with sebaceous lustre; mesosternum densely punctured; abdomen uniformly, densely and minutely punctured.

Lancet (Fig. 21) with 25 serrulae, each serrula almost flat having single indistinct anterior and several small posterior subbasal teeth.

MALE. Average length, 11.0 mm. Similar to female except: mesosternum entirely pale; terga 7-9 almost entirely black; mesotarsus black. Penis valve (Fig. 13) and gonoforceps (Fig. 17).

Material examined. HOLOTYPE: Female, Uttar Pradesh, Mandal, 2,080 m, 23.6.1983. PARATYPES: 11♀, 8♂♂ with same data as holotype. 1♀, Uttar Pradesh, Hanumanchatti, 2,400 m, 1.6.1984. 1♂, Himachal Pradesh, Kalatop, 2,385 m, 1.7.1984. 2♀, Sikkim, Mangan, 1,280 m, 13.5.1985.

Remarks. This new species shows close similarity to *T. simlaensis* Cameron, 1876. However, it can be distinguished from the latter on account of having inner orbit not green, postocellar area entirely black, antenna totally black, temple without a pale spot, antenna filiform and mesepisternum shallowly punctured.

In *T. simlaensis* the inner orbit and lateral side of the postocellar area are pale green, the scape is pale green in male, the temple has pale spot, the antenna is distinctly incrassate and apex of mesepisternum has distinct and deep punctures.

Etymology. The species is named after the hills among which is situated its type locality.

***Tenthredo manganensis*, new species**

Figs. 2, 8, 14, 18, 22

Description. FEMALE. Average length, 11.6 mm. Head and thorax yellowish, black as follows: flagellum of antenna; mandible tip; frontal spot anteriorly covering median and lateral foveae leaving supraantennal tubercle, laterally not touching eye margin and posteriorly reaching hypothetical hind margin of head; postocellar area; median and lateral spots on posterior side of head; irregular medial transverse stripe on pronotum; mesonotum except V-shaped margin of middle lobe and broad spot outer to scutellum on lateral lobe; band along hind margins of meso- and metascutelli; nebulous spot on mesopostnotum; metanotum except spot lateral to scutellum; narrow hind margin of metapostnotum; parapterum; stripe along each pleural suture; mesosternum except stripe along medial groove. Abdomen yellowish brown except black lateral spots (confluent in middle) on terga 1-4, and following pale: posterior margin and lateral side of propodeum; deflexed sides of terga 6-9; small nebulous spot on each sternum. Legs yellowish with the following reddish brown: mesofemur

posteriorly in distal half; metafemur except immediate base; meso- and metatibiae and tarsi. All tarsal joints infuscate towards tips. Wings yellowish hyaline, forewing subinfumate towards apex, costa and stigma reddish yellow, venation dark brown.

Antenna slightly compressed towards apex, $2.2\times$ head width, segments 3 and 4 in ratio 4:3; clypeus (Fig. 2) roundly to subsquarely incised up to $\frac{1}{5}$ of its medial length; labrum broader than long in ratio 6:5 with narrowly rounded anterior margin; malar space $0.6\times$ diameter of lateral ocellus; LID:IDMO:EL = 2.0:4.0:4.1; OOL:POL:OCL = 3.5:1.0:2.2; frontal area below level of eyes; supraantennal tubercle raised and merging into insignificant frontal ridge; median fovea narrow, faintly carinate; circum-, inter- and postocellar furrows clear; lateral furrow sunken and slightly diverging posteriorly; postocellar area subconvex, broader than long in ratio 3:2 at maximum width; head narrowing behind eyes; ITD:ICD = 2.7:1.0; mesoscutellum roundly raised; appendage faintly carinate; mesepisternum obtusely raised with short, blunt carina at apex; mesosternum cornered but without distinct thorns; apical tooth of claw (Fig. 8) longer than subapical; metabasitarsus as long as following 3 joints combined; metafemur shorter than tibia.

Head shining, almost impunctate; mesonotum polished having few punctures on middle lobe; mesoscutellum with deep and distinct punctures on posterior slope only; appendage, metanotum and scutellum impunctate; mesepisternum shallowly punctured with sebaceous lustre; mesosternum minutely and distinctly punctured; propodeum shining, remaining terga faintly microsculptured.

Lancet (Fig. 22) with 28 serrulae, each serrula quite flat having 2 anterior and up to 25 small posterior subbasal teeth.

MALE. Average length, 10.7 mm. Similar to female except: mesosternum pale leaving narrow anterior margin; metacoxa with black outer stripe. Penis valve (Fig. 14) and gonoforceps (Fig. 18).

Material examined. HOLOTYPE: Female, Sikkim, Mangan, 1,200 m, 13.5.1985. PARATYPES: 4♂, with same data as holotype. 2♀, Uttar Pradesh, Mandal, 2,150 m, 15-16.6.1985.

Variation. Most of mesopleuron black.

Remarks. In Malaise's (1945) key this species shows distant similarity to *T. siabataka* (Rohwer, 1921). However, it can be separated from the latter by the yellowish ground color of the head, the metafemur and tibia without black, the abdomen without red, the stigma yellowish brown and the head narrowing behind eyes.

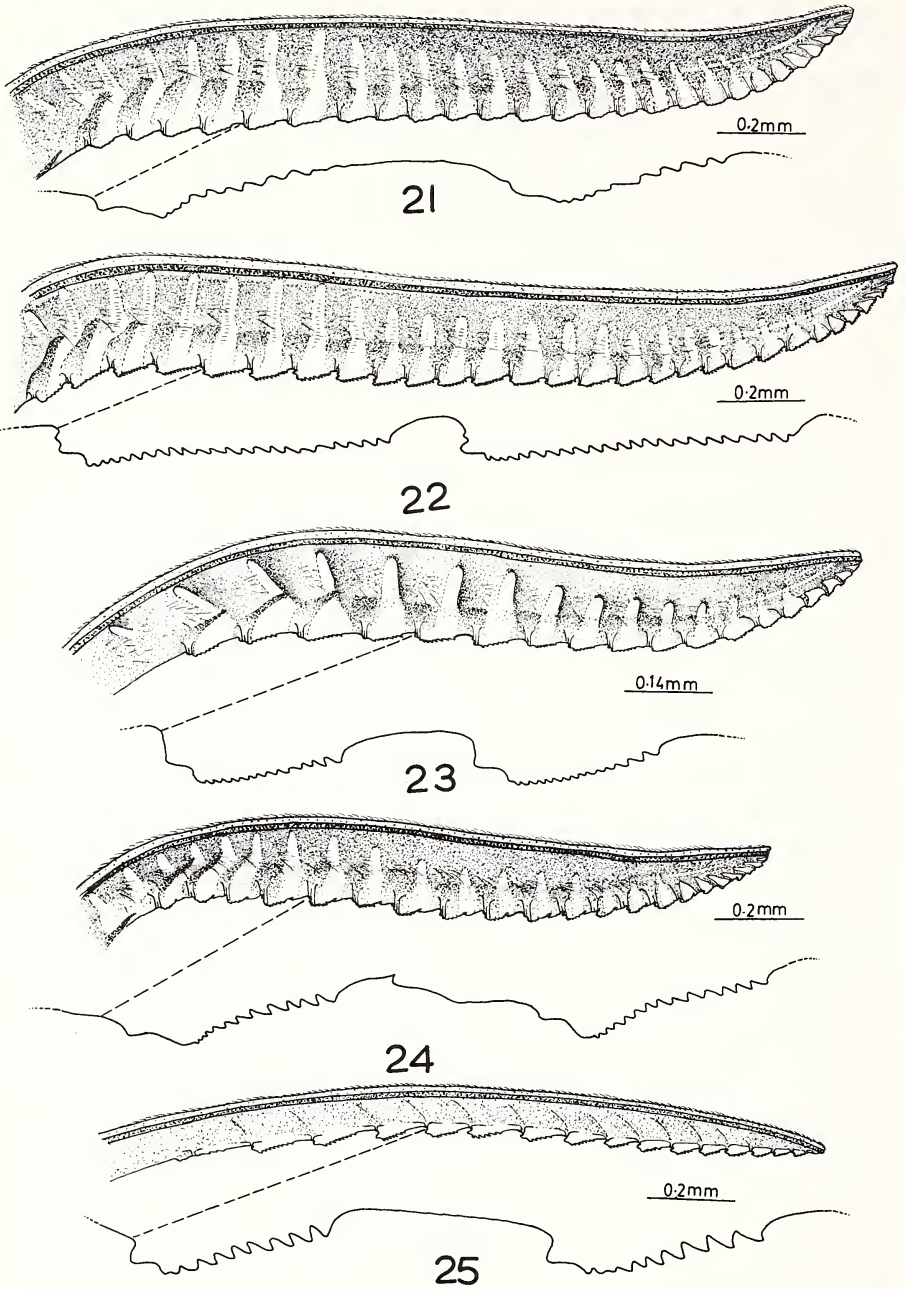
In *T. siabataka* the ground color of the head is black, the metafemur and tip of the tibia are black, the abdominal segments 2-5 are reddish, the stigma is black and the head is dilated behind eyes.

Etymology. The species name has been taken from the type locality.

***Tenthredo flatopleura*, new species**

Figs. 3, 9, 23

Description. FEMALE. Length, 9.8 mm. Body black, reddish brown as follows: mandible except extreme apex; femora except immediate bases; meso- and metatibiae and tarsi except some infuscation on posterior side. Wings clear, costa and stigma brown, venation dark brown to black.



Figs. 21-25. Lancet. 21. *garhwali*. 22. *manganensis*. 23. *flatopleura*. 24. *muchi*. 25. *corrugatocephala*.

Antenna filiform, $2.8 \times$ head width, segments 3 and 4 in ratio 6:5; clypeus (Fig. 3) sub squarely incised up to $\frac{1}{3}$ of its medial length; labrum cordate, broader than long in ratio 6:5 with roundly pointed anterior margin; malar space $2.2 \times$ diameter of lateral ocellus: LID:IDMO:EL = 2.0:2.5:2.3; OOL:POL:OCL = 3.3:1.0:1.7; frontal area almost at level of eyes; supraantennal tubercle moderately raised and confluent with similar frontal ridge; median fovea ditch-like with shallow pit in front of median ocellus; circum- and postocellar furrows sharp, interocellar one pit-like; lateral furrow sunken, slightly diverging posteriorly; postocellar area flat, sloping backwards and broader than long in ratio 7:4; head narrowing behind eyes; ITD:ICD = 3.3:1.0; mesoscutellum subpyramidally raised with distinct longitudinal carina; appendage carinate; mesepisternum almost flat and both sides of thorax appear parallel when seen from front, anteriorly and below with curved carina; mesosternum lacking thorns; apical tooth of claw (Fig. 9) longer than subapical; metabasitarsus much longer than following 3, but shorter than remaining 4 joints combined; metafemur shorter than tibia.

Frontal area with large, shallow and almost confluent punctures, rest of head minutely and densely punctured; mesonotum dull, densely punctured; mesoscutellum and appendage densely punctured along with microsculpture; metanotum and scutellum with shallow punctures and microsculpture; mesepisternum rugose posterior to carina; anterior aspect of mesepisternum and sternum entirely, densely and distinctly punctured; abdomen microstriated.

Lancet (Fig. 23) with 18 serrulae, each serrula with single shelf-like anterior and numerous posterior subbasal teeth.

MALE. Unknown.

Material examined. HOLOTYPE: Female, Uttar Pradesh, Mandal, 2,100 m, 25.6.1985.

Remarks. This new species is quite closely related to *T. cyanata* Konow, 1898. However, it can be easily distinguished from the latter by the black labrum, clypeus and dorsal angle of pronotum, predominant reddish brown color on legs, antennal segment 3 longer than 4, and the subpyramidally raised mesoscutellum.

In *T. cyanata* the labrum, clypeus and dorsal angle of pronotum are pale, the legs are black with pale markings, antennal segment 3 is shorter than 4 and the mesoscutellum is only slightly raised.

Etymology. The species name pertains to the almost flat mesopleuron.

***Tenthredo muchei*, new species**

Figs. 4, 10, 24

Description. FEMALE. Length, 11.4 mm. Antenna black except distal $\frac{1}{3}$ of segment 6, and 7–9 entirely, brownish yellow. Head pale, black as follows: mandible tip; broad frontal spot anteriorly covering median fovea leaving tip of supraantennal tubercle, laterally not touching eyes and posteriorly reaching hypothetical hind margin of head; postocellar area; broad medial spot on hind orbit; posterior side of head except spot behind postocellar area. Thorax and abdomen black, pale yellow are: broad dorsal and ventral angles of pronotum; tegula; triangular apex of mesonotal middle lobe; meso- and metascutelli; appendage; medial spot on metapostnotum; small spot on mesepimeron; large spot on mesepisternum; metepisternum; stripe along posterior

margins of terga 2-5 and 8 (this stripe triangularly broadened in middle, becoming narrow towards lateral side and again broadened on deflexed aspect); medial triangular spot near distal margins of terga 6 and 7; tip of abdomen; all sterna; trochanters along with adjacent parts of coxae and femora; frontside of procoxa, femur and tibia; middle of tibiae; infuscated tips of all tarsal joints. Wings clear, apex of fore one subinfusate, costa and stigma fulvous, venation light to dark brown.

Antenna filiform, $2.6 \times$ head width, segments 3 and 4 in ratio 4:3; clypeus (Fig. 4) roundly to squarely incised up to $\frac{2}{3}$ of its medial length; labrum broader than long in ratio 3:2 with deflexed and rounded anterior margin; malar space $2.1 \times$ diameter of lateral ocellus; LID:IDMO:EL = 2.0:2.6:1.9; OOL:POL:OCL = 3.4:1.0:2.0; frontal area at level of eyes; supraantennal tubercle raised and confluent with similar frontal ridge; median fovea broad with deep pit in middle; circum-, inter- and postocellar furrows fine and clear; lateral furrow narrow, slightly diverging posteriorly; postocellar area convex, broader than long in ratio 3:2 at maximum width; head slightly narrowing behind eyes; ITD:ICD = 4.0:1.0; mesoscutellum distinctly raised, its posterior slope faintly carinate; appendage slightly carinate; mesepisternum obtusely raised without carina or acute apex; mesosternum angled but lacking thorns; apical tooth of claw (Fig. 10) longer than subapical; metabasitarsus as long as following 3 joints combined; metafemur shorter than tibia.

Head densely punctured with faint microsculpture, punctures become less dense and minute along hind orbit; mesonotum more regularly and densely punctured than head with strong microsculpture; mesoscutellum shallowly punctured; appendage minutely wrinkled; metanotum and scutellum with few shallow punctures; mesepisternum minutely and densely punctured, subrugose at apex; mesosternum punctulate with distinct microsculpture; abdomen faintly microstriated.

Lancet (Fig. 24) with 20 serrulae, each serrula with single shelf-like anterior and numerous posterior subbasal teeth.

MALE. Unknown.

Material examined. HOLOTYPE: Female, Uttar Pradesh, Flower Valley, 3,300 m, 17.6.1983.

Remarks. This new species shows some relationship to *T. habenata* Konow, 1907 and *T. variicolor* Malaise, 1945. However, it can be distinguished from both of them by the body without liver brown color, distal $\frac{1}{3}$ of antennal segments 6 and 7-9 entirely yellowish, lower half of the hind orbit pale, the mesepisternum with a prominent pale spot, a single pale spot on metapleuron, black color predominant on legs, the postocellar area broader than long, the apex of mesepisternum rounded without carina and each serrula of lancet with single anterior subbasal tooth.

In *T. habenata* the hind orbit is without pale, the mesepisternum is entirely black, the metapleuron has 2 pale spots, only the stripe on the metacoxa and tips of femora and tibiae black and the postocellar area longer than broad.

In *T. variicolor* the body is liver brown with black and pale yellow markings, the apical $\frac{1}{2}$ of antennal segments 4 and 5-8 are entirely yellowish, the mesepisternum has short carina at the apex and each serrula of lancet has 2 anterior subbasal teeth.

Etymology. This species has been named in honor of Dr. H. Muehe of East Germany, the only worker who has made a contribution on Indian *Tenthredo* after Malaise (1945).

***Tenthredo corrugatocephala*, new species**

Figs. 5, 11, 15, 19, 25

Description. FEMALE. Average length, 10.8 mm. Body black, pale to prasinus as follows: basal half of mandible; labrum and clypeus; triangular spot on supraclypeal area; dot on extreme tip of supraantennal tubercle; spot on lower hind orbit touching eye; dorsal angle of pronotum; tegula except distal spot; anterior slope of mesoscutellum; ridges lateral to meso- and metascutelli; small lateral spot on appendage; medial spot on metapostnotum; narrow hind margins of terga 2–4; deflexed sides of all terga; sterna; frontside of procoxa except small spot, pro- and mesofemora except extreme bases, pro- and mesotibiae and tarsi; narrow stripe on metafemur and tibia. Forewing yellowish hyaline, hind one clear, stigma and venation dark brown to black.

Antenna stout, $1.8 \times$ head width, segments 3 and 4 in ratio 3:2; clypeus (Fig. 5) roundly incised up to $\frac{2}{3}$ of its medial length with truncate lateral teeth; labrum cordate, broader than long in ratio 4:3 with roundly pointed anterior margin; malar space $0.5 \times$ diameter of lateral ocellus; LID:IDMO:EL = 2.0:4.3:3.2; OOL:POL:OCL = 3.7:1.0:2.0; frontal area slightly below level of eyes; supraantennal tubercle raised and more or less confluent with frontal ridge; median fovea broad with shallow pit in middle and faint longitudinal carina in anterior half; circum-, inter- and postocellar furrows sharp; lateral furrow deep and slightly excurved; postocellar area subconvex, broader than long in ratio 7:4 at maximum width; head neither dilated nor narrowing behind eyes; ITD:ICD = 2.7:1.0; mesoscutellum raised with faint indication of longitudinal carina on posterior slope; appendage carinate; mesepisternum raised to acute apex; mesosternum without thorns; apical tooth of claw (Fig. 11) longer than subapical; metabasitarsus shorter than following 3 joints combined; metafemur slightly shorter than tibia.

Head strongly wrinkled with faint microsculpture, hind orbit minutely and densely punctured; mesonotum distinctly and densely punctured; anterior slope of mesoscutellum shallowly punctured, its posterior slope and appendage with large and deep punctures; metanotum distinctly punctured; metascutellum with well separated shallow punctures; mesepisternum subrugose; mesosternum distinctly punctulate; abdomen microstriated with few distinct and scattered punctures.

Lancet (Fig. 25) narrow with 17 serrulae, each serrula with single lobe-like anterior and about 10 distinct posterior subbasal teeth.

MALE. Average length, 9.2 mm. Similar to female except: metascutellum with pale spot; pale hind margins of terga 2–4 triangularly broadened in middle; head slightly narrowing behind eyes. Penis valve (Fig. 15) and gonoforceps (Fig. 19).

Material examined. HOLOTYPE: Female, Uttar Pradesh, Gobinddham, 3,000 m, 20.6.1985. PARATYPES: 2♀♀, 4♂♂, with same data as holotype. 1♂, Uttar Pradesh, Flower Valley, 3,300 m, 21.6.1985. 2♀♀, 4♂♂, Uttar Pradesh, Chopta, 3,000 m, 25–27.6.1985.

Variation. Metaleg without pale green markings; mesoscutellum entirely black.

Remarks. This new species shows similarity to *T. segregata* Konow, 1908a, and *T. pseudomelaena* Malaise, 1945. However, it can be distinguished from both of them by the entirely black, mesonotum, the mesoscutellum except its anterior slope, the appendage and the mesopleuron; terga 2–5 without a medial longitudinal band; the

head not narrowing behind the eyes (at least in the female) and the face strongly wrinkled on and around the frontal area.

In *T. segregata*, the medial spot on the mesonotum, the mesoscutellum and the appendage are pale; terga 2-5 possess pale longitudinal band and the face is smooth and shining.

In *T. pseudomelaena*, the mesopleuron is pale with a dorsoventral black band, the head is strongly narrowing behind eyes and the face has few scattered punctures only.

Etymology. The species name pertains to the strongly wrinkled head.

***Tenthredo valvurata*, new species**

Figs. 6, 12, 16, 20

Description. FEMALE. Unknown.

MALE. Length, 10.2 mm. Antenna black except; scape leaving spot on innerside, tips of segments 3 and 4 and underside of 5-9, pale. Body prasinus, black as follows: mandible tip; narrow stripe encircling each ocellus; longitudinal irregular stripe outer to frontal ridge, anteriorly reaching supraantennal pit and expanded laterally at level of lateral ocellus; spot near posterolateral corner of postocellar area; stripe along anterior $\frac{2}{3}$ of median furrow of mesonotal middle lobe and Y-shaped mark near its apex extending up to mesoscutellum; two irregular spots on mesonotal lateral lobe; spot lateral to cenchrus and one on deflexed area of metanotum; narrow hind margin of metapostnotum; narrow stripe interrupted in middle along basal margins of terga 2-4; stripe along apical half of metacoxa and trochanter, distal half of profemur, meso- and metafemora, and all tibiae, posteriorly; inner and outer stripes on metatarsus. Wings clear, costa and stigma pale green, venation dark brown to black.

Antenna filiform, $2.6 \times$ head width, segments 3 and 4 in ratio 5:4; clypeus (Fig. 6) broadly sub squarely incised up to $\frac{1}{3}$ of its medial length with triangular lateral teeth; labrum broader than long in ratio 7:6 with rounded anterior margin; malar space $9.5 \times$ diameter of lateral ocellus; LID:IDMO:EL = 2.0:3.8:4.0; OOL:POL:OCL = 3.3:1.0:2.2; frontal area much below level of eyes; supraantennal tubercle distinctly raised, sloping back and more or less confluent with frontal ridge; median fovea broad and shallow; circum-, inter- and postocellar furrows sharp; lateral furrow deep; postocellar area subconvex, broader than long in ratio 7:4; head strongly narrowing behind eyes; ITD:ICD = 2.7:1.0; mesoscutellum distinctly raised, bluntly pointed and with transverse carina; appendage faintly carinate; mesepisternum obtusely raised with rounded apex; mesosternum lacking thorns; apical tooth of claw (Fig. 12) longer than subapical; metabasitarsus shorter than following 3 joints combined; metafemur as long as tibia.

Head subshining, minutely, sparsely and shallowly punctured; mesonotum polished; mesoscutellum with some fine punctures; appendage impunctate; metanotum and scutellum with few shallow punctures; mesepisternum smooth with sebaceous luster; mesosternum punctulate; abdomen faintly microsculptured. Penis valve (Fig. 16) and gonoforceps (Fig. 20).

Material examined. HOLOTYPE: Male, Himachal Pradesh, Narkanda, 2,080 m, 25.5.1984.

Remarks. This new species shows similarity to *T. trunca* Konow 1908b and *T.*

chlorogaster Malaise, 1945. However, it is distinguished from both of these species due to having tips of antennal segments 3 and 4 along with the underside of 5-9 pale, median fovea without black, clypeus deeply and distinctly incised, mandible normal and mesonotum polished with strong luster.

In *T. trunca*, the flagellum is entirely black, the anterior margin of clypeus is almost truncate and the mandible has a strong mesial flap.

In *T. chlorogaster*, the median fovea is black and the mesonotum is opaque due to strong microsculpture.

Etymology. The species name pertains to the characteristic shape of the valvura in penis valve.

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